Taxes and subsidies

Market-based instruments play a key role in facilitating the transition towards green growth. Compared to regulatory instruments, such as emission limits or prescriptive technology standards, environmentally related taxation encourages the lowest-cost abatement across polluters. It also provides incentives for abatement at each unit of pollution. In addition, the revenue raised can be used to support fiscal consolidation or to reduce other taxes (e.g. taxes on labour and capital that distort the labour supply and saving decisions). Shifting the overall tax burden away from labour and capital towards environmentally harmful consumption and production patterns, while maintaining the overall level of redistribution constant, can improve economic efficiency.

Governments levy taxes to raise revenue or to discourage certain behaviour. Historically most environmentally related taxes were introduced primarily to raise revenue. Today, however, they provide important market signals. These aim to influence the behaviour of producers and consumers by shaping the relative prices of substitute goods.

Phasing out government support measures for environmentally harmful products or activities should accompany efforts to green the tax system. Such measures directly undermine efforts to green the tax system by perpetuating wasteful consumption or production patterns. Moreover, they represent an opportunity cost to society: the resources could instead be directed to other more productive uses.

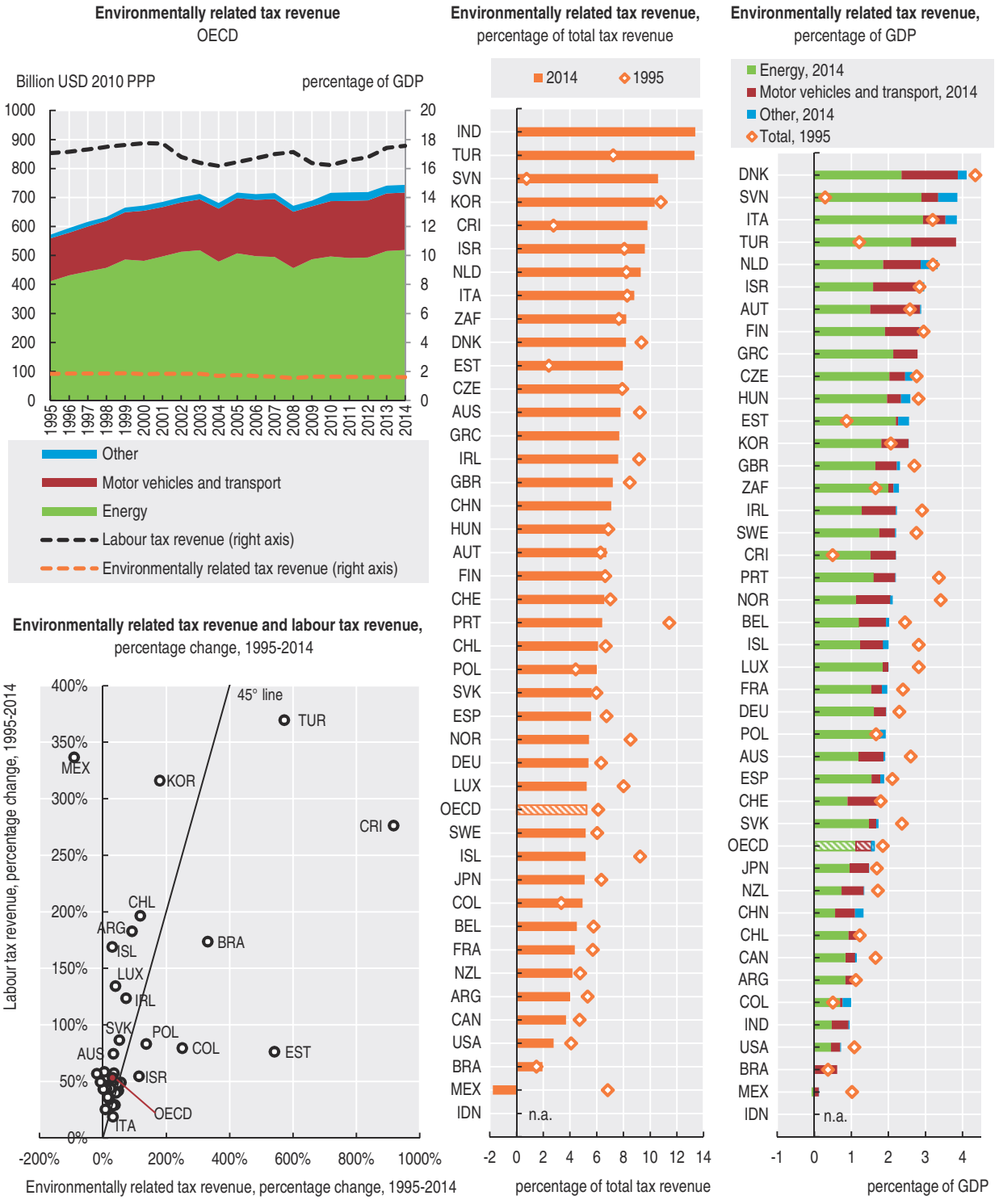
There are two main challenges. First, green tax reform should address environmental externalities across all sources of emissions (or all resource users) in a systematic way. Second, all types of support or preferential tax rates for fossil fuels should be eliminated. This also implies that potentially regressive distributional impacts must be addressed outside of the environmentally related tax through additional targeted measures to protect vulnerable households. In addition, governments should use taxation to provide predictable and transparent market signals to guide long-term investment decisions (e.g. in alternative energy sources). Finally, stronger international coordination can mitigate potential losses in competitiveness of domestic industries. At current carbon prices, limited negative impacts on competitiveness have been found (see *Further reading*).

Main trends and recent developments

The share of environmentally related taxes in total tax revenue and compared to GDP is decreasing

The use of environmentally related taxes is growing but remains limited in many countries. The revenue raised from these taxes represents about 5.2% of all tax revenue, equivalent to 1.6% of GDP in the OECD area. The increase in crude oil prices up until mid-2014 triggered substitution away from motor fuel use. It also made adjustments in nominal

Figure 15.1. **Revenue from environmentally related taxes declined as a share of total tax revenue and compared to GDP**



Note: All monetary values are expressed in constant USD using PPPs.
Source: OECD (2016a), "Environmental policy instruments", *OECD Environment Statistics* (database); OECD (2016b), "Revenue statistics", *OECD Tax statistics* (database).

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tax rates on motor fuels politically difficult. Yet some countries, such as Slovenia, Costa Rica, Turkey and Estonia strengthened the role of environmentally related taxes and have tripled their share of tax revenue since 1995 (Figure 15.1). During this time period, final consumption of oil products has risen much less than the revenue from environmentally related taxes.

Over the past 15 years, countries such as Israel, Poland, Estonia, Colombia, Costa Rica, Brazil and Turkey have shifted part of their revenue collection from labour to environmentally related activities. Some countries have introduced new environmentally related taxes as part of fiscal consolidation, e.g. taxes on nuclear fuel and air travel, carbon taxes or vehicle tax rates linked to CO_2 emissions and, sometimes, to local air pollution. However, most countries have experienced higher increases in their revenue from labour taxes relative to that of the environment.

Energy and transport dominate the tax base

In most countries, taxes on energy consumption generate most of the revenue among environmentally related taxes. In 2014, energy products, including motor fuels, contributed 70% of revenues. Revenues raised on other tax bases were much lower. Motor vehicles and transport generated 26% of revenue, for example. Waste and water management, forestry, mining and hazardous chemicals generated 4%. Nevertheless, taxation of a wide variety of tax bases with environmental relevance is becoming more common. Further, many of these tax bases are highly elastic. That means such taxes can have important environmental benefits even if they do not raise much revenue.

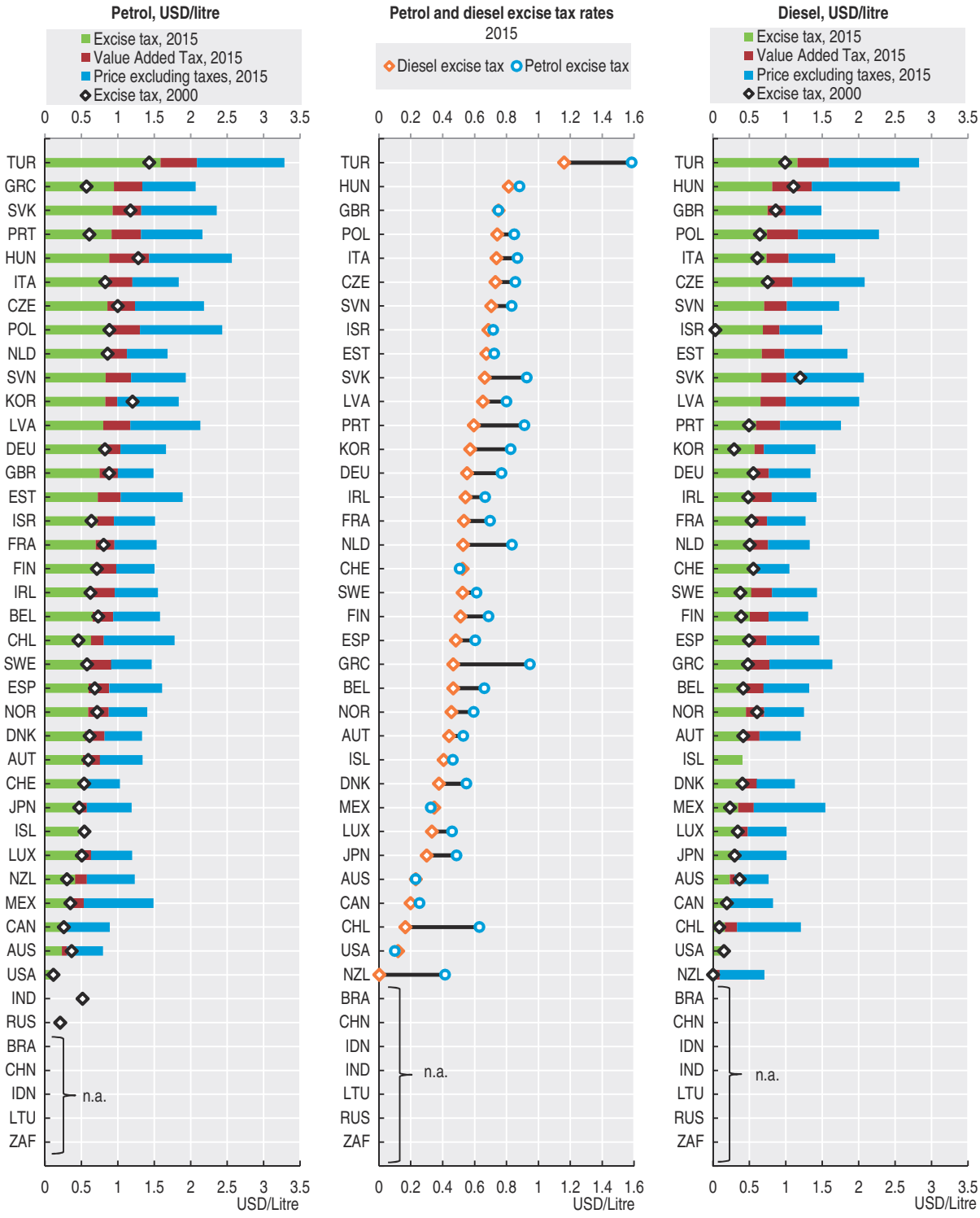
Most countries tax petrol more heavily than diesel despite the higher carbon and air pollutant emissions of diesel

Excise taxes on diesel have increased in a half of OECD countries while only a third of OECD countries have increased taxes on petrol, in real terms. Most countries still apply higher excise tax rates on petrol than on diesel fuel (Figure 15.2). Some also provide value added tax (VAT) rebates or other preferential tax treatment for diesel-powered company cars. This is regrettable from an environmental perspective. Diesel causes more emissions of CO_2 and local air pollutants than an equivalent volume of petrol, meaning that its tax per litre should be higher. A litre of diesel normally allows more kilometres to be driven than petrol. However, this is a driving-related externality that is fully internalised by the consumer. In the OECD area, only Switzerland, Mexico and the United States have a higher excise tax rate per litre on diesel. The United Kingdom and Australia do not differentiate between these fuels. In all remaining OECD countries the tax rate per litre on petrol is higher than on diesel. The rate is twice as high in Chile and Greece, while New Zealand applies only a minimal excise tax on diesel.

Significant gaps remain in taxation of non-road carbon emissions

Effective carbon rates (i.e. the price of carbon emissions resulting from carbon taxes, excise taxes on energy use, and tradable emission permits) are particularly low in sectors outside road transport. In OECD countries, the average effective rate outside the transport sector is EUR 7.90 per tonne of CO_2. Only 6% of priced emissions are above 30 EUR/t (i.e. a conservative estimate of their cost to society) and 65% of emissions are not priced at all. BRIICS economies (Brazil, Russian Federation, India, Indonesia, People's Republic of China, South Africa), have an average effective rate of 1.30 EUR/t. Only 2% are priced above 30 EUR/t and 81% of emissions are unpriced (see OECD, 2016c) (Figure 15.3).

Figure 15.2. **Motor fuel taxation is increasing in half of OECD countries**



Note: Prices and taxes are expressed in constant 2010 USD using PPPs, deflated using the Consumer Price Index.
Source: IEA (2016a, 2016b), *IEA Energy Prices and Taxes Statistics* (database).

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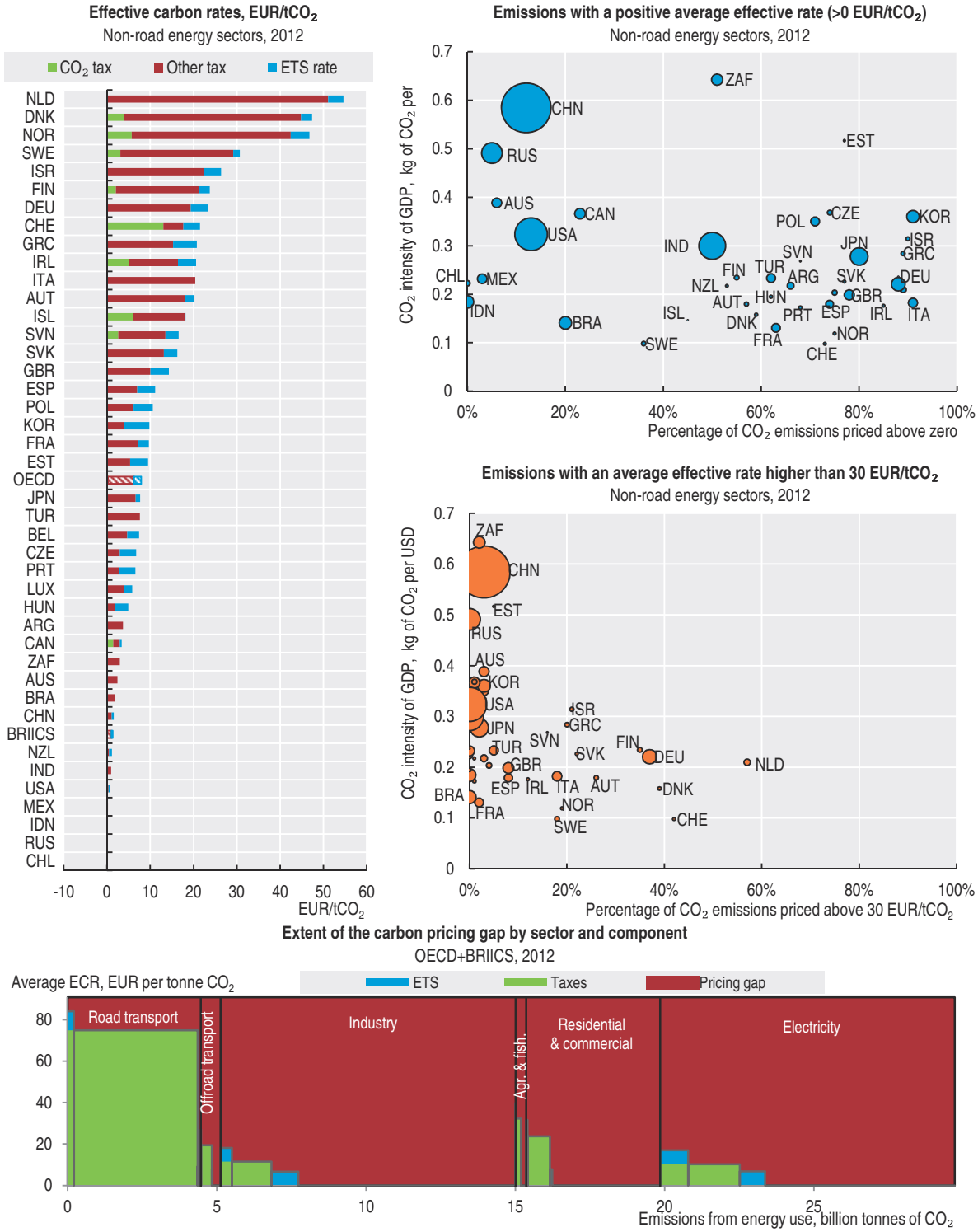
Figure 15.3. **Most carbon emissions are not priced at their climate costs**



Note: The size of bubbles shows total CO_2 emissions from non-road energy sectors. OECD total represents a weighted average, excluding Latvia (the country became a member of the OECD after the calculations were carried out).

Source: OECD (2016c), *Effective Carbon Rates: Pricing CO_2 through Taxes and Emissions Trading Systems*.

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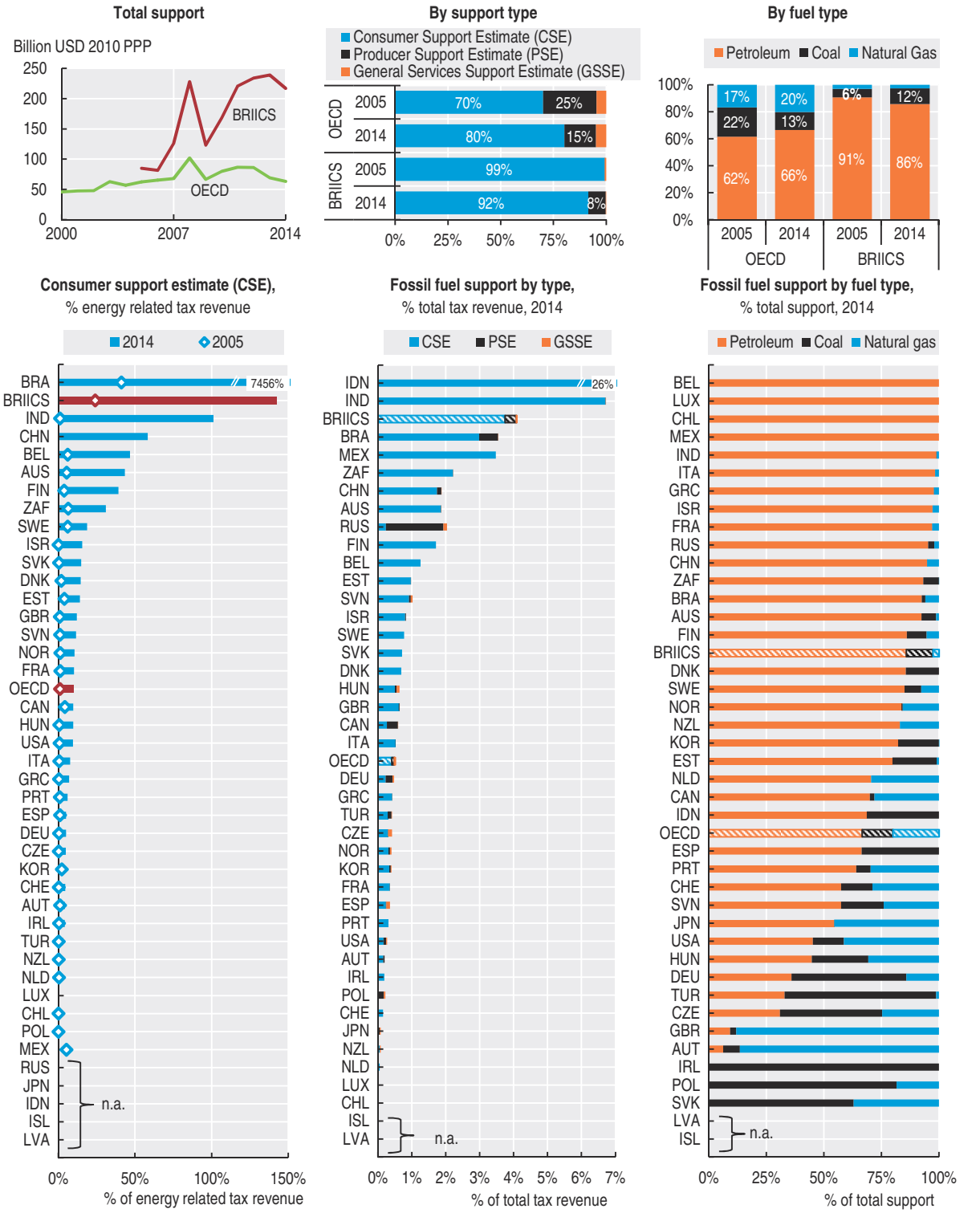
Figure 15.4. **OECD and BRIICS still support fossil fuels**



Note: In panel D, the rapid increase for Brazil is due to a fall in energy-related tax revenues (denominator) and an important increase in the CSE (numerator).

Source: OECD (2016d), "Inventory of support measures for fossil fuels".

StatLink http://dx.doi.org/10.1787/888933484976

Road transport has comparatively higher effective carbon rates. For example, OECD countries have an average effective rate of 91 EUR/t. They have 44% of emissions priced above 30 EUR/t and 1% of emissions unpriced (49% and 6% for BRIICS, with an average rate of 30.2 EUR/t). These rates are almost entirely due to specific taxes on road transport fuel. These taxes were originally introduced primarily for reasons other than climate change mitigation. Nevertheless, they have an impact on CO_2 emissions. For example, CO_2 taxes (introduced in 11 countries) account for 2% of the average effective rates for OECD countries. Meanwhile emission trading systems (ETS) account for 21%. And excise and specific taxes account for the remaining 77% of the composition of the rate in non-road sectors. Overall, the data suggest that policies largely fall short of pricing carbon emissions (Figure 15.3d), as well as other negative environmental impacts caused by energy use.

There is wide variation in effective carbon rates and the low levels of taxation of fuels with significant environmental impacts. This suggests important opportunities for countries to reform their energy tax systems and achieve environmental goals more cost-efficiently.

Government support for environmentally harmful products or activities

Governments support energy production in a number of ways. They intervene in markets to influence costs or prices. They transfer funds to recipients directly and assume part of market risk. And they selectively reduce taxes recipients would otherwise have to pay and undercharge for use of government-supplied goods or assets. Governments support energy *consumption* through several channels: price controls intended to regulate the cost of energy to consumers, direct financial transfers, rebates on purchases of energy products and tax relief.

Support to fossil fuels in OECD countries amounts to more than USD 60 billion per year

In its online *Inventory*, the OECD identified close to 800 individual producer or consumer support mechanisms for fossil fuels at the national or sub-national levels. Between 2005 and 2014 the composition of support in the OECD shifted away from coal (from 21% to 13%). Conversely, in BRIICS economies, support shifted to coal (from 6% to 12%).

The aggregate estimated value of these mechanisms in OECD countries amounted to USD 63 billion in 2014 (down from USD 84 billion in 2011). In BRIICS economies, this value increased from USD 85 billion in 2005 to USD 217 billion in 2014. In OECD countries, about 80% of support was directed at consumers, 15% at producers and 5% at general services. In BRIICS, the bulk of support is also directed towards the consumption of refined petroleum products (Figure 15.4).

Government support for fossil fuels undermines the effectiveness of environmental policies by bringing down the already low cost of emitting CO_2. This erects a formidable barrier to achieving a more energy-efficient and low-carbon economy. Not only do fossil-fuel subsidies undermine efforts to mitigate climate change, but they also distort costs and prices. These distortions, in turn, make production and use of energy less efficient throughout the economy.

Fossil-fuel subsidies affect allocation of resources across sectors. For example, long-term capital investment can be directed towards those sectors that produce fossil fuels or use them intensively. This can be done at the expense of low-carbon energy and other economic activities more generally.

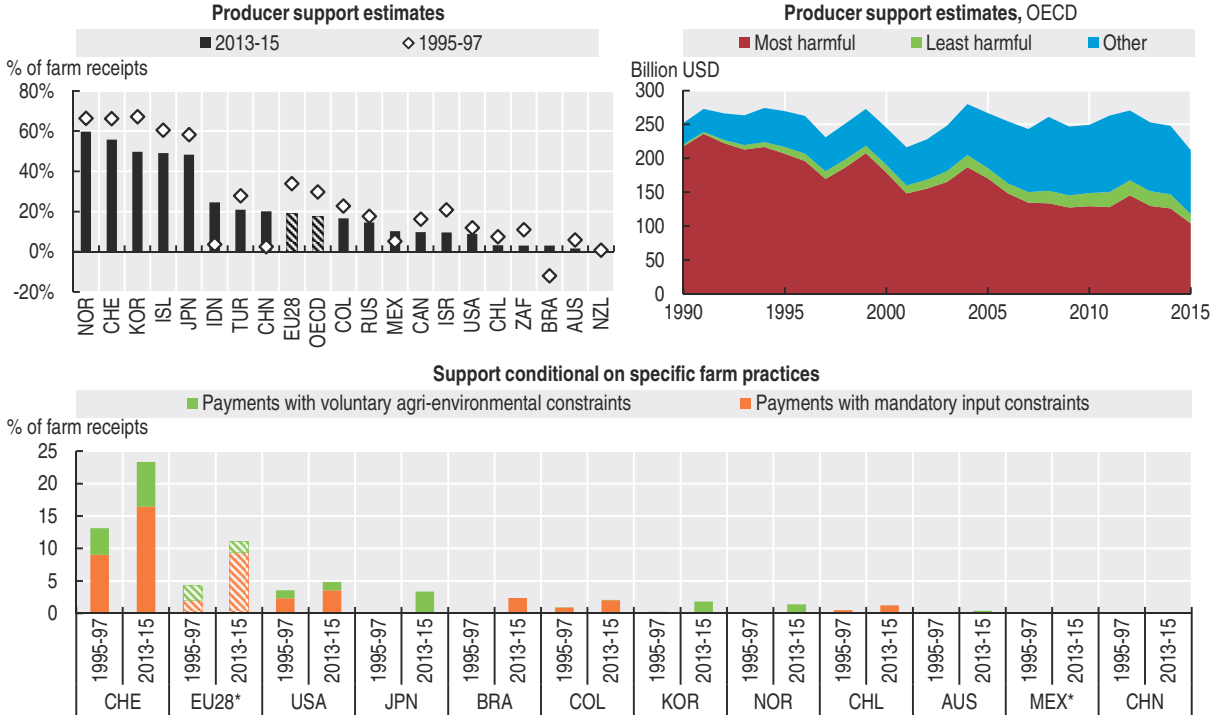
Policies supporting fossil fuels can impair an economy's long-term productive capacity. Such subsidies can also impose considerable strain on government budgets. Subsidies either increase public expenditure or reduce tax revenue. This is particularly problematic at a time when many countries are taking painful steps to reduce their public debt (OECD, 2015).

The overall level of environmentally harmful support to farmers decreased

In 2015, total annual support to agriculture in the OECD represented about 0.8% of GDP. This encompasses producer, consumer and general services support. In most OECD countries, producer support (PSE) decreased – both, in terms of levels (Figure 15.5a) and compared to GDP (from 1% in 2000 to 0.55% in 2015).

The composition of PSE has changed in two respects that are relevant for the environment. First, since 1990, the potentially most environmentally harmful government support to farmers has declined. On average, in OECD countries, it has dropped from 86% to about 50% of PSE (Figure 15.5b). Countries have made concerted efforts to decouple support from commodity output and prices. However, the potentially least environmentally harmful support accounts for only 7% in the OECD area. Second, support is increasingly tied to environmental conditions (cross compliance). It links the provision (or withdrawal) of support payments to specific farm practices and environmental performance criteria (Figure 15.5c).

Figure 15.5. **The potentially most environmentally harmful government support for agriculture is declining**



Note: MEX* = 1995-97 is replaced by 1991-93 for Mexico. EU28* = EU15 for 1995-97, EU27 for 2012-13 and EU28 for 2014-15.
Source: OECD calculations based on the classification in OECD (2013) and data extracted from OECD (2016e), "Agricultural support estimates (Edition 2016)", *OECD Agriculture Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933484989

Measurability and interpretation

The indicators presented in this chapter relate to the following:

- **Environmentally related tax revenue**, expressed as a percentage of total tax revenue, and compared to GDP and to labour tax revenue. The structure of the tax base is given as a complement. Labour taxes include taxes on personal income and profits, social security contributions and payroll. See also *Glossary*.
- **Road fuel taxes and prices** expressed in constant 2010 USD using purchasing power parities (PPPs) and deflated using the Consumer Price Index.
- **Effective carbon rates** are expressed in EUR per tonne of CO_2. They are the total price that applies to CO_2 emissions from energy use as a result of CO_2 taxes, specific taxes on energy use and the price of tradable emission permits. The "carbon pricing gap" shows the extent to which effective carbon rates fall short of pricing CO_2 emissions.
- **Support for fossil fuels** is presented by fuel type and by type of support, as defined in the OECD framework for Producer and Consumer Support Estimates. Support estimates are expressed as percentages of total support, compared to total tax revenue and in 2010 USD using PPPs.
- **Support for agriculture** is presented by support type, indicating the potentially environmentally harmful elements of government support to producers. Support considered potentially most environmentally harmful consists of market price support, payments based on commodity output without imposing environmental constraints on farming practices, and payments based on variable input use without imposing environmental constraints on farming practices. For more details, see OECD (2013: pp. 67-68).

The indicators on environmentally related taxes should not be used to assess the "environmental friendliness" of the tax systems. For such analysis, additional information, describing the economic and taxation structure of each country, is required. Moreover, a number of environmentally related taxes can have important environmental impacts, even if they raise little (or no) revenue. In addition, revenue from fees and charges, and from royalties related to resource management, is not included.

The compilation of energy prices is increasingly a challenge. Deregulation of energy markets leads to an important increase in the number of market players. This generates difficulties in collecting price data on an equivalent basis. Cross-country comparisons should be done with care. For instance, using purchasing power parities might exaggerate the differences in fuel prices between countries. Further, consumer price indexes might not reflect the exact evolution of energy prices over time. As a result, this could hide policy developments in fuel taxation in nominal terms (e.g. indexing of excise tax rates in Norway).

The effective carbon rate profiles are amenable for inter-country comparison. Nevertheless, the tax profiles do not account for differentiated value added tax (VAT) rates on energy products within the different countries. Such differentiated rates alter relative prices and should therefore in principle be accounted for. However, the approach focuses on the specific rate to give clear policy recommendations from an environmental pricing point of view. In addition, these rates are expressed irrespective of external costs additional to those of CO_2 emissions. For example, excise taxes can also serve as (imprecise) instruments to internalise congestion, noise and air pollution costs. Ideally, these rates should be compared to the full array of external costs they intend to cover.

Information on fossil-fuel support at national or sub-national levels is available from the *OECD Inventory of Support Measures for Fossil Fuels*. Data on tax expenditures, which represent the majority of the support mechanisms, are not fully comparable across countries. They need to be interpreted with caution, bearing in mind that tax regimes can differ substantially (e.g. depreciation allowances). Fossil-fuel support is often calculated as deviation from the benchmark taxation. However, countries define the benchmark in different ways, making international comparisons difficult. The indicators on government support measures do not provide enough information to judge the environmental impact of specific measures, nor do they indicate which measures should be considered for possible reform or removal. For example, not all support measures for fossil fuel are unambiguously inefficient and some caution is required in interpreting the support amounts.

Agricultural support estimates, available from the *OECD Agriculture Statistics*, are a useful tool for assessing the progress achieved in policy reform. These indicators, however, do not allow measuring the effects on production, consumption, trade and environment. The PSE should not be considered as an indicator of trade distortions. It is an aggregate measure of transfers resulting from a wide variety of policies that support agriculture. These policies may have different effects on quantities produced and consumed, and hence on trade. However, the OECD PSE classification of categories of policy measures has the potential to show the degree of flexibility in production choices that farmers face. This allows better understand how different policies could influence farmers' decisions to produce commodity and non-commodity outputs.

This chapter focuses on market-based policy instruments but regulatory (command-and-control) approaches can also play a role in the transition towards green growth. OECD work on a proxy indicator of Environmental Policy Stringency (EPS) seeks to measure both types of policy responses across 15 environmental domains combined into a composite index over 1990-2015 (see Botta and Koźluk, 2014). Currently, the EPS index covers primarily climate and air pollution policies in energy and transport, but efforts are on-going to integrate also water pollution policies (see *http://oe.cd/eps*).

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